

REMARKS

Claims 1-27 are pending in the application. Claims 1-11 and 27 were withdrawn from consideration and stand with traverse. Claims 12-26 were rejected. The following remarks are believed to be fully responsive to the Office Action, and reconsideration of this application is respectfully requested.

CLAIM RESTRICTION

Claims 1-11 and 27 are cancelled, without prejudice.

CLAIM REJECTIONS – 35 U.S.C. §112

Claims 12-26 stand rejected under 35 U.S.C. §112, first paragraph, because the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims, for the reason set forth on page 3 of the Office Action.

In detail, Examiner pointed out that the specification, while being enabling for forming a barrier layer along a stepped portion over the surface of an interdielectric layer having a recessed region, and forming a copper seed layer on the barrier layer, does not reasonably provide enablement for exposing the barrier layer until exposing the surface of the interdielectric layer by chemical mechanical polishing using a solution comprising an oxidizing agent, a pH controlling agent, a chelate reagent, and deionized water so that the copper seed layer remains only within the recessed region.

According to the invention of claim 12, a method of manufacturing a copper metal interconnection layer is provided which includes the steps of: forming a barrier layer along a stepped portion over the surface of the interdielectric layer having a recessed region; forming a copper seed layer on the barrier layer; and exposing the barrier layer until exposing the surface of the interdielectric layer by chemical mechanical polishing (**CMP**) using a solution comprising an oxidizing agent, a pH controlling agent, a chelate reagent, and deionized water so that the copper seed layer remains only within the recessed region.

A conventional CMP process is described on page 1, lines 23-29, in the specification of the present invention, as follows:

"Generally, the CMP process applies combining chemical effects of chemical solutions with mechanical effects of a polisher and polishing particles. When a wafer surface contacts a pad, a slurry for CMP process flows into a minute gap between the contact surfaces of the wafer and the pad, so that a mechanical operation is performed by abrasive particles within the slurry and bumps on the surface of the pad, and a chemical removing operation is performed by a chemical component within the slurry."

This information about the CMP process is already known to one skilled in the relevant art. Patent disclosures need not teach that which is already known to one of ordinary skill in the relevant art. Furthermore, what is known to one of ordinary skill in the art needs not be expressly set forth to provide an enabling disclosure, otherwise every specification would have to set forth all of the process steps necessary to form a claimed method.

The exposing of the barrier layer until exposing the surface of the interdielectric layer is carried out by the CMP as explained in the specification including the passage cited above. Further, claim 12 recites that the CMP is carried out using a solution comprising an oxidizing agent, a pH controlling agent, a chelate reagent, and deionized water so that the copper seed layer remains only within the recessed region. The solution for the CMP according to the present invention does not include an abrasive. (See lines 3-11, page 5). Therefore, small down pressure and rapid platen speed would be recommendable in order to effectively perform the CMP step. Applicants respectfully submit that one skilled in the art would be able to use the solution as claimed in connection with the CMP process taught in the instant specification to arrive at the features as claimed in claim 12 without undue experimentation.

Applicants, therefore, respectfully submit that the rejection under 35 U.S.C. §112, first paragraph, be withdrawn.

Claim 13 stands rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, for the reason set forth on page 4 of the Office Action.

Claim 13 has been amended to clearly define the scope of the invention and comply with Examiner's rejection. In view of the amendments above, it is respectfully


requested that the rejection under § 112 second paragraph also be withdrawn.

CONCLUSION

In light of the above amendments and remarks, Applicants submit that all claims 12-26 considered and currently presented are in condition for allowance. Accordingly, Applicants respectfully request that Examiner pass this case to issue. If Examiner believes that personal contact with Applicant's representative would expedite prosecution of the application, she is invited to call the undersigned at her convenience.

Respectfully submitted,

By: _____


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ATTACHMENT FOR SPECIFICATION AMENDMENTS

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The following is a marked up version of the amended title of the specification in which underlines indicate insertions and brackets indicate deletions.

[SOLUTION FOR CHEMICAL MECHANICAL POLISHING AND] METHOD [OF] ~~FOR~~
MANUFACTURING COPPER METAL INTERCONNECTION LAYER USING [THE
SAME] CHEMICAL MECHANICAL POLISHING